

ART. 10. A NEW EUOMPHALID GASTROPOD FROM THE CONEMAUGH FORMATION, PENNSYLVANIAN

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The various species of euomphalid gastropods have been of particular interest to workers in Pennsylvanian stratigraphy since Knight (1934) followed by Moore and others (1944) called attention to the possible value of these forms as index fossils. The new species described below, which has been noted previously (Burke, 1958) as characterizing the Carnahan Run member of the Conemaugh formation, Pennsylvanian, may eventually prove to have limited vertical distribution in the Conemaugh. It also throws some light on trends within the subgenus *Amphiscapha*.

I am much indebted to various institutions and their representatives for assistance in carrying on this study. These include the United States National Museum and Dr. G. A. Cooper, Head Curator of Geology, for the privilege of examining collections and of borrowing and exchanging specimens. Dr. E. L. Yochelson of the United States Geological Survey has generously helped me by discussion and by placing specimens at my disposal for study. The Carnegie Museum, through Director Dr. M. Graham Netting, in addition to providing for the publication of this paper, has given me full access to its study collections and facilities. Dr. E. R. Eller, for whom the new species is named, has kindly loaned me literature from his personal library and given me much encouragement in the work. I am very grateful to Mr. Raymond Patalski of the Applied Research Laboratory of the United States Steel Corporation for the photographs from which the illustrations were taken.

All of the fossil material upon which the present description is based is from my personal collection and has been given to Carnegie Museum.

SYSTEMATIC PALEONTOLOGY

- Family Euomphalidae Koninck, 1881
- Genus *Amphiscapha* Knight, 1942
- Subgenus *Amphiscapha* Knight, 1942
- Amphiscapha (Amphiscapha) elleri* sp. nov.
- Fig. 1, A-N

*Diagnosis:* Smallest known species of *Amphiscapha* (maximum width about 10 mm.); elevation of final whorl moderate; upper and lower faces of mature whorls usually flattened or slightly concave; upper angulation a weak, crenulated carina; lower angulation a distinct but narrow bourrelet; outer whorl face more rounded in profile than in *Amphiscapha catilloides* (Conrad) or *Amphiscapha reedsi* (Knight) and tending to expand beyond base in late maturity and old age.

*Types:* Holotype, Carnegie Museum Catalogue of Invertebrate Fossils No. 28728; paratypes, Carnegie Museum Catalogue of Invertebrate Fossils No. 28729, 28730 and 28731.

*Referred Specimens:* Two polished thin sections, Carnegie Museum Catalogue of Invertebrate Fossils No. 28732 and 28733 (both figured); twelve other specimens, Carnegie Museum Catalogue of Invertebrate Fossils No. 28607 through 28618 (unfigured).

*Occurrence:* Carnahan Run member, Conemaugh formation, Pennsylvanian.

*Locality:* All specimens collected from the Carnahan Run member at Gosser Hill, Westmoreland County, Pa., across the Kiskiminitas River from Leechburg, Pa.

*Description:* This species comprises discoidal gastropods closely related to *Amphiscapha catilloides* (Conrad) and similar to the latter species in coiling habit. The spire and base are both often gently concave, although sometimes the base is flat, but the effect can be misleading and due to compression.

The shell is composed of approximately  $5\frac{1}{2}$  whorls, of which about  $2\frac{1}{4}$  whorls make up the protoconch, which is simple externally, but internally bears septa or partitions. The septa in this species vary in number from one to five, insofar as I can determine, and appear to be confined to the protoconch. Full maturity in *Amphiscapha elleri* appears to have been reached after about  $5\frac{1}{4}$  whorls; the subsequent stage, as indicated by coarsening and irregularity in lines of growth coupled with a somewhat inflated appearance of the final quarter of the body whorls, seems to be characteristic of old age. None of my specimens exceeds 10 mm. in width at this latter stage, and it seems fair to assume that this was close to the maximum width for the species.

The upper sutures are linear to grooved. The upper whorl surface curves up from the suture and inclines outward approximately 15 degrees from vertical, then bends about 20 degrees from the horizontal in the mature stage, or 30 degrees in the subsequent growth stage, to terminate at the upper angulation. This surface becomes flattened or slightly concave at one-fifth the width of the whorl face from the suture at maturity, or at about one-eighth of the distance at later stages of growth, when the effect is most evident. The surface steepens as it approaches the upper angulation, but grades indistinctly into the carina, which is relatively inconspicuous and ornamented with low, irregular crenulations.

The outer whorl surface becomes slightly concave below the upper carina, forming a very shallow sulcus. From the sulcus, the surface inclines outward some 50 degrees from the vertical in mature individuals, or 30 degrees in older specimens, reaching the periphery near midheight in the mature stage and at about two-fifths the height in old age. The whorl surface then bends inward as much as 20 degrees in mature and about 10 degrees in advanced stages of growth becoming slightly concave as it approaches the base and forming a shallow lower sulcus.

The lower angulation consists in a relatively narrow bourrelet; it is not drawn out to form a carina or keel, and it is better described as a rounded edge with irregular undulations, rather than crenulations.

The bourrelet walls the basal whorl face; internal to it the whorl face is sometimes slightly convex, but more often flattened or somewhat concave. The basal sutures are linear.

These shells are widely phaneromphalus. The umbilical angle appears to show considerable variation, and I have measured angles ranging from 145 to 155 degrees.

The upper lip is slightly prosocline, making an angle of 80 to 85 degrees with a tangent to the whorl at the suture and bending slightly opisthocline near the carina. The outer lip is prosocline from the upper angulation (carina) and continues prosocline, deviating 7 to 10 degrees from vertical

across the outer whorl face. The lower lip is prosodine across the bourrelet and base, curves slightly forward midway between the bourrelet and the suture, and then straightens somewhat in its course into the umbilicus.

*Discussion:* Many shells of *Amphiscapha elleri* are poorly preserved, and the matrix is tightly adherent, requiring hours of preparation with the needle for complete removal. Measurements of such prepared specimens, however, are at best only approximations, for the majority of these shells have suffered damage through compression after burial. Yochelson (1956) has warned against interpretations of such shells based only on surface appearance, and I concur heartily with his remarks. I have found whorl profile the most reliable means of differentiating the Conemaugh species of *Amphiscapha*, but to determine the profile with any assurance requires polished or thin sections. My description is based mainly on study of such sections.

All of my type specimens show damage to some extent, and particularly in the area near the aperture, where the shell wall was thin and susceptible to mashing. Nevertheless, these shells were selected because they had attained full growth and best illustrated most of the characteristics of the species. The two polished sections (Fig. I, M and N) however, exhibit the profiles of undamaged whorls, and were obtained only after rejection of many specimens that displayed mashing or fracture after sectioning.

In the Conemaugh formation the subgenus *Amphiscapha* appears to be represented by two divergent groups of species. One of these lines is best typified by *Amphiscapha catilloides* (Conrad) from the Brush Creek member. Mature whorls of this species show definite upper and lower carinae, but the outer walls are not flattened in profile; Conrad (1842, p. 273) described this region as "obtusely carinated in the middle." These shells also bear a basal bourrelet, indicated in Conrad's figure of the type (1842, plate 15, fig. 3). It is to Conrad's species that *Amphiscapha elleri* shows closest resemblance, differing mainly in its smaller size, more obtuse outer whorl face, and lesser development of carinae. Like *Amphiscapha catilloides* (Conrad) the form from the Carnahan Run member possesses a well-defined basal bourrelet. In most respects the Conrad species shows greater specialization despite its occurrence at a lower horizon in the Conemaugh than that from which *Amphiscapha elleri* is derived. Related species, such as *Amphiscapha subrugosa* (Meek and Worthen) and *Amphiscapha muricata* (Knight) similarly outstrip the two Conemaugh forms.

A second line representative of the subgenus *Amphiscapha*, characterized by the Desmoinesian species *Amphiscapha reedsi* (Knight), also occurs in the Conemaugh. In comparison with *Amphiscapha catilloides* (Conrad) and *Amphiscapha elleri*, the Knight species shows (1) an outer whorl face that is relatively flat, rather than rounded in profile, (2) a basal whorl face that tends to be convex, rather than flattened or somewhat concave, and (3) a basal bourrelet that is weakly developed or entirely lacking. Specimens in my collection from the Cambridge member near New Concord, Ohio, compare well with shells of *Amphiscapha reedsi* (Knight) from the Desmoinesian.

My collections indicate the presence of an undescribed species of *Amphiscapha* in the Ames member, and possibly another undescribed form in the Cambridge. It is planned to treat of these in a subsequent paper dealing with Conemaugh species of *Amphiscapha* in general.

Measurements of *Amphiscapha* (*Amphiscapha*) *elleri*

|        | Holotype<br>(28728)* | Paratype<br>(28729) | Paratype<br>(28730) | Paratype<br>(28731) |
|--------|----------------------|---------------------|---------------------|---------------------|
| Height | 2.7 mm.              | 2.8 mm.             | 2.8 mm.             | 2.8 mm.             |
| Width  | 9.6 mm.              | 9.1 mm.             | 9.7 mm.             | 9.5 mm.             |

\* Numbers in parentheses indicate Carnegie Museum catalogue numbers of the respective specimens.

## Explanation of Fig. 1.

Approximate enlargements: A-L, 3 times natural size. M and N, 6 times natural size.

Numbers in parentheses indicate Carnegie Museum catalogue numbers of the respective specimens.

All specimens from the Carnahan Run member, Conemaugh formation, Pennsylvanian, at Gosser Hill, near Leechburg, Pa.

Fig. 1. *Amphiscapha* (*Amphiscapha*) *elleri* sp. nov.

- A,B,C. Top, oblique top and umbilical views of the holotype (28728)
- D,E,F. Top, oblique top and umbilical views of the smallest paratype (28729)
- G,H,I. Top, oblique top and umbilical views of the largest paratype (28730)
- J,K,L. Top, oblique top and umbilical views of another paratype (28731). Attached tube of *Serpulopsis* sp. showing in umbilical view.
- M. Polished section of a referred mature specimen (28732). Reflected light.
- N. Polished section of a referred specimen at an advanced stage of growth (28733). Reflected light.

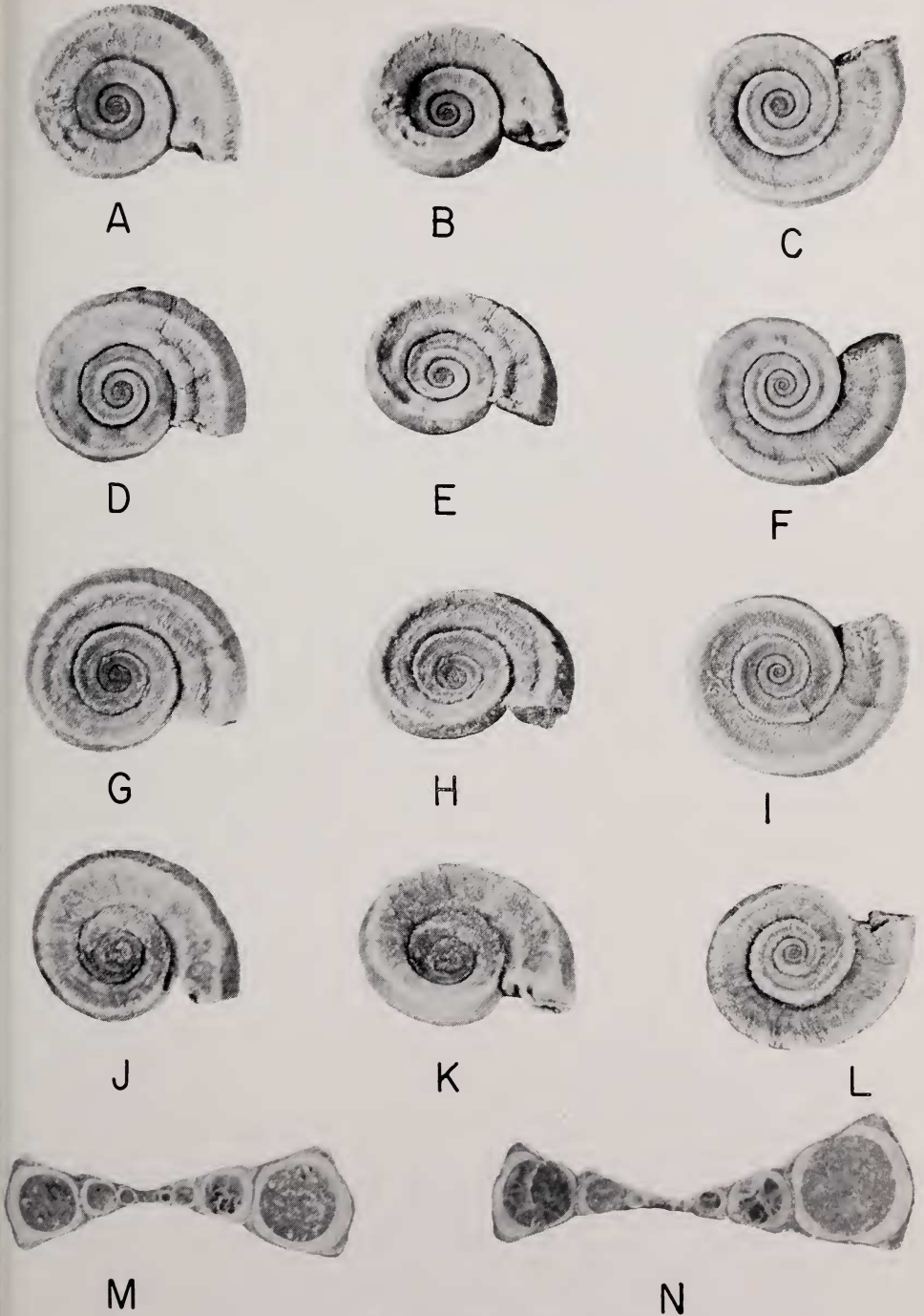


Fig. 1. *Amphiscapha (Amphiscapha) elleri* sp. nov.

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